UCRL- 85680 Vugraph
PREPRINT

REVIEW AND FUTURE ACTIONS

by

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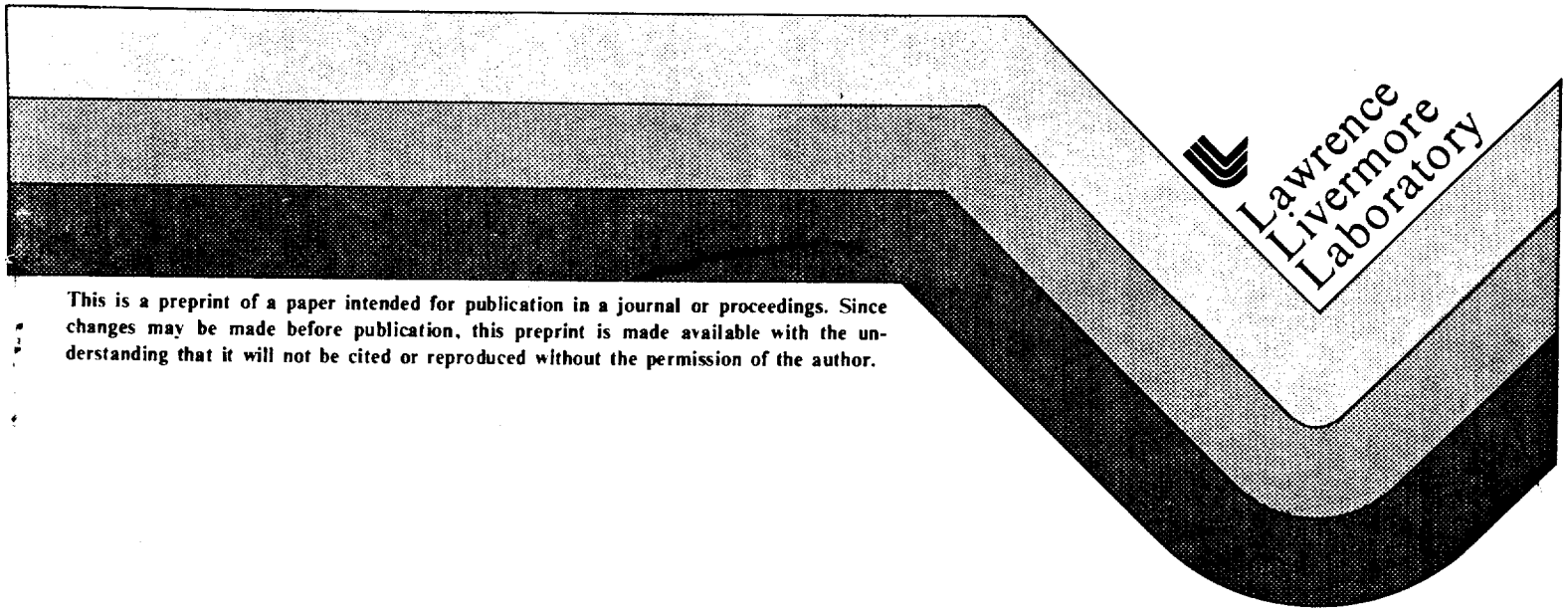


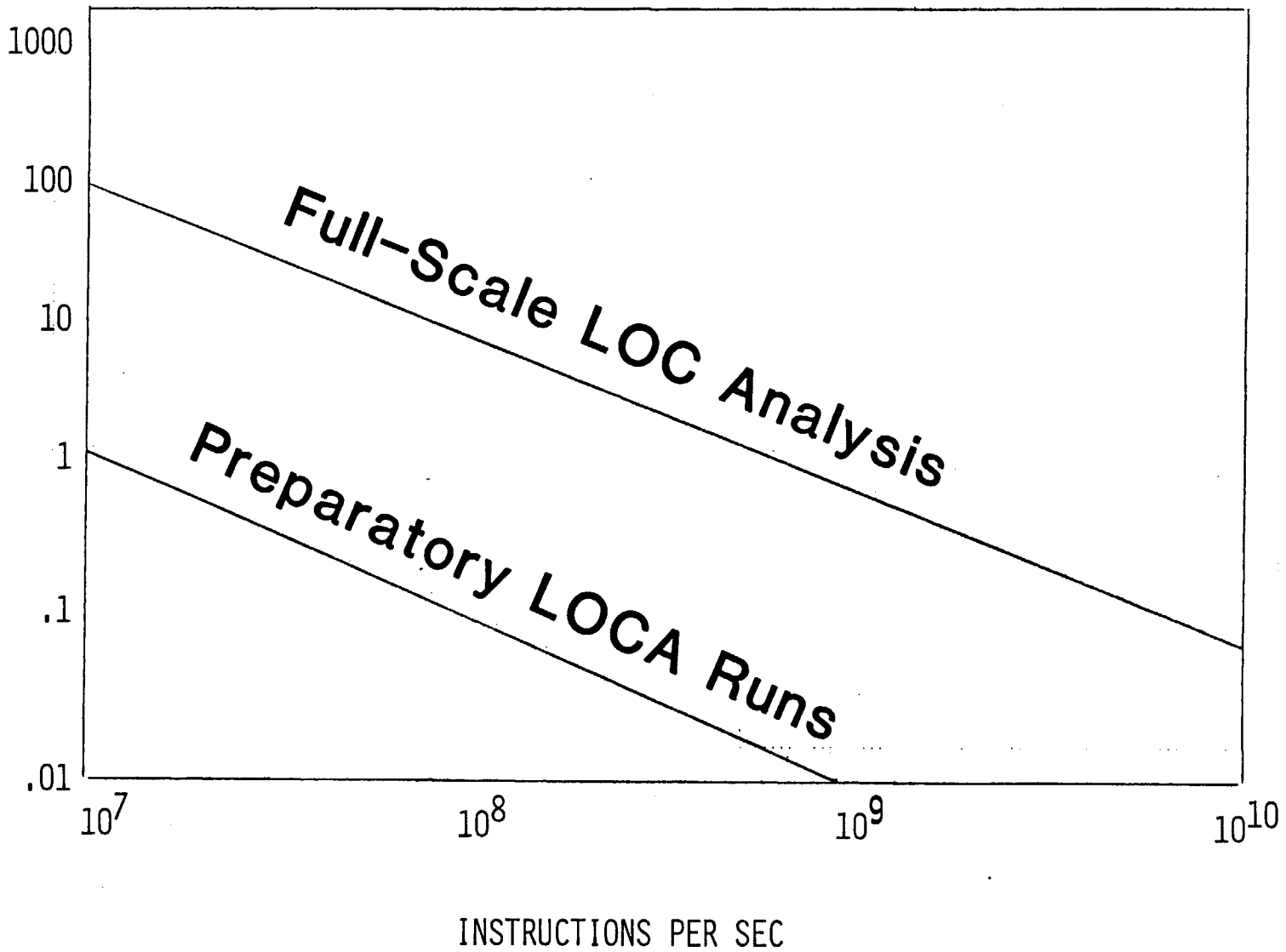
DISCLAIMER

CONSIDER TEST PROBLEMS

	MONTE CARLO	
	EULERIAN	ZONES x ITEMS/ZONE x TIME STEPS
2D	LANGRANGIAN	100 x 100 x [~30 x ~750]
3D	HYDRODYNAMICS	(20 - 200) [500 - 1000]
	HEATFLOW	

- CURRENT METRICS

PROCESSOR SPEEDS:		
	$(\sim 3000 \frac{\text{ZONE CYCLES}}{\text{SEC}})_{7600}$	$(\sim 20000 \text{ ZC/SEC})_{CRAY}$
	3 - 8 MFLOPS 30 PEAK	6 - 80 MFLOPS 120 PEAK
FLOATING POINT OPERATIONS PER MASS POINT	(~300 - 3000)	PROB. DEPENDENT


1000
100
10
1
.1
.01
RUN TIME (HOURS)
Full-Scale LOC Analysis
Preparatory LOCA Runs
10^7
10^8
10^9
10^{10}
INSTRUCTIONS PER SEC

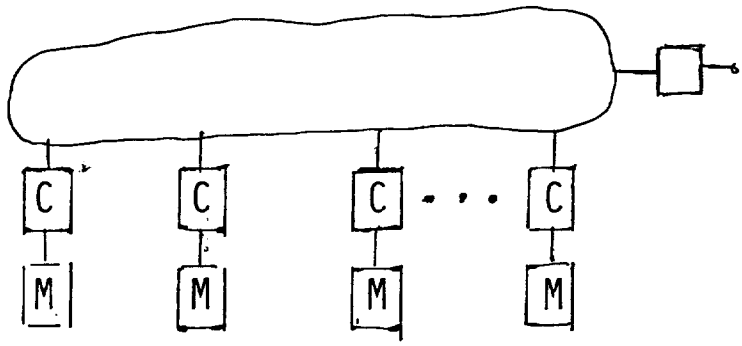
ARCHITECTURES

SEQUENTIAL ($\Rightarrow$ IMPROVED COMPONENTS)

PIPELINE (VECTOR) : MULTIPLE PIPES

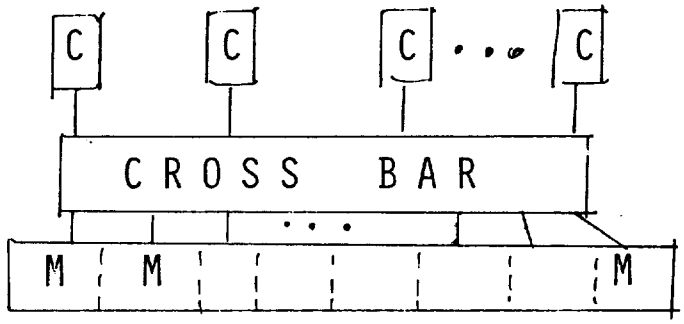
MULTIPROCESSOR

RING STRUCTURE



CROSS BAR

E.G. LLNL'S S-1



DATA FLOW

ALGORITHMS

REVAMPING OF P.D.E.'S WITH RESPECT TO:

- PARTICULAR ARCHITECTURES
- NEW ZONING TECHNIQUES
  FEWER MASS PTs
  MAINTENANCE OF ACCURACY
- NEW MATHEMATICAL RESULTS

BETTER OPERATING SYSTEM DESIGNS

- DISTRIBUTED
- EFFICIENT
- TIME SHARING

LANGUAGES

- FORTRAN
  - NEW PERFORMANCE ANALYSIS TOOLS
  - BETTER STRUCTURING
  - VECTOR EXTENSIONS

- NON-FORTRAN
  - PASCAL ETC.
  - ADA (PRAXIS)
  - VAL (DATA FLOW + MULTIPROCESSING)
  - ?

- SYMBOLIC MANIPULATION
  - KNOWLEDGE BASED

GOAL

THE BEST PERFORMANCE LEVEL AVAILABLE IN 1980

IMPROVED BY 1985, BY A FACTOR OF 10, AND BY 1990, IMPROVED BY A FACTOR OF 100.

THE MEANING OF OUR GOALS

10X (100X) FASTER BY 1985 (1990)

THE USER GETS RESULTS

10(100) TIMES FASTER AND/OR RUNS LARGER PROBLEMS

EFFECTIVENESS IS THE MEASURE

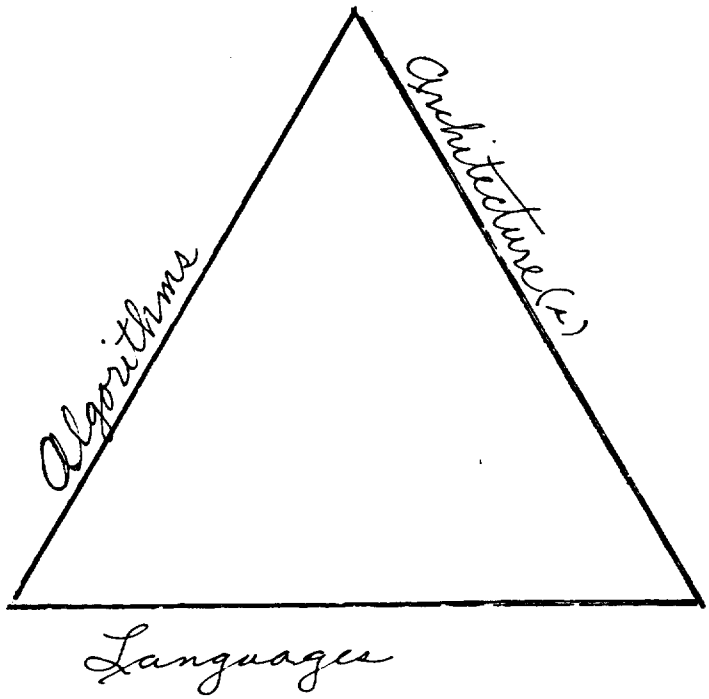
BALANCE IS NECESSARY

RESEARCH PATHS

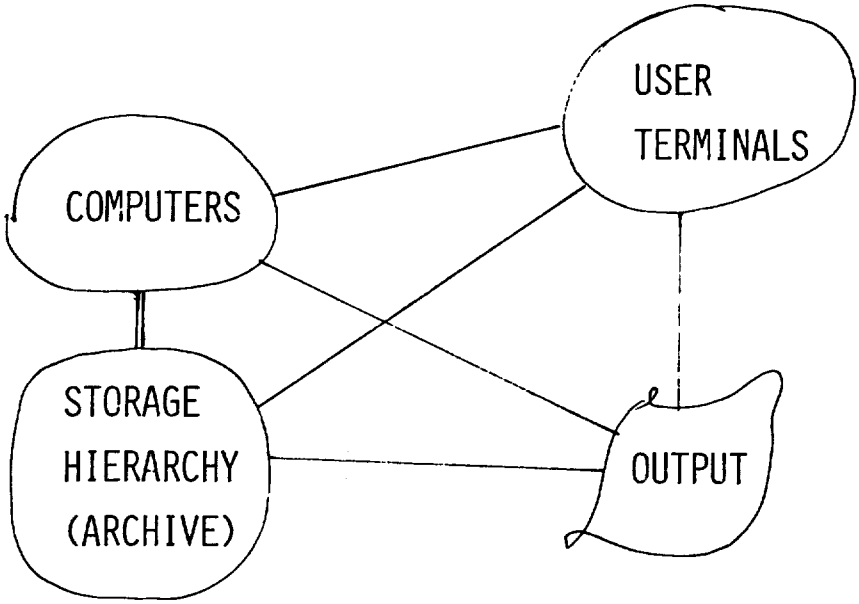
AXIOMS

- IMPROVING CPU PERFORMANCE IS NECESSARY BUT NOT SUFFICIENT

- THE COMBINED SKILLS OF ALL WILL BE NECESSARY TO APPROACH OUR GOALS



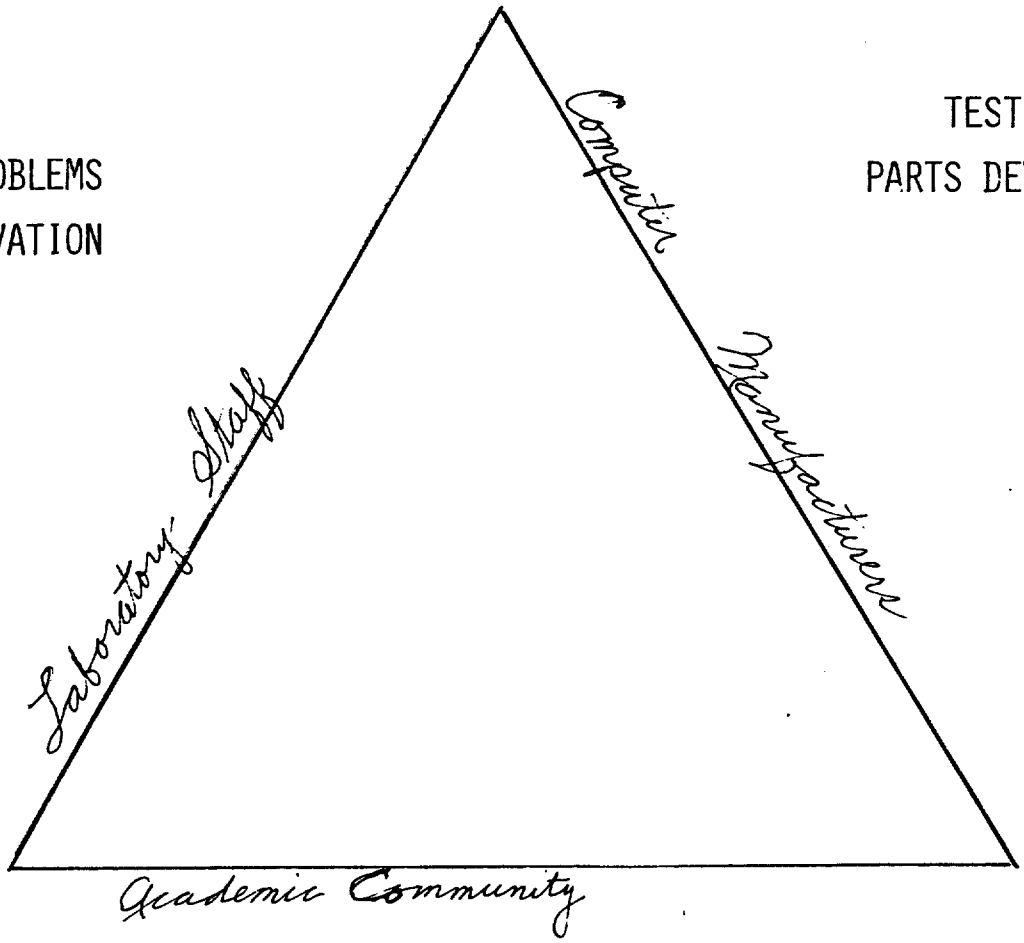
A BALANCED SYSTEM - REQUIRED



PROCEDURE

COLLABORATION

TEST
PROBLEMS
MOTIVATION



TEST BED
PARTS DEVELOPMENT

THEORY
STUDENT GROWTH

- VISITOR EXCHANGE
  - POST DOCTORALS
  - SABBATICALS
  - STAFFS
- CONSULTANTS

PRESENT ATTITUDE

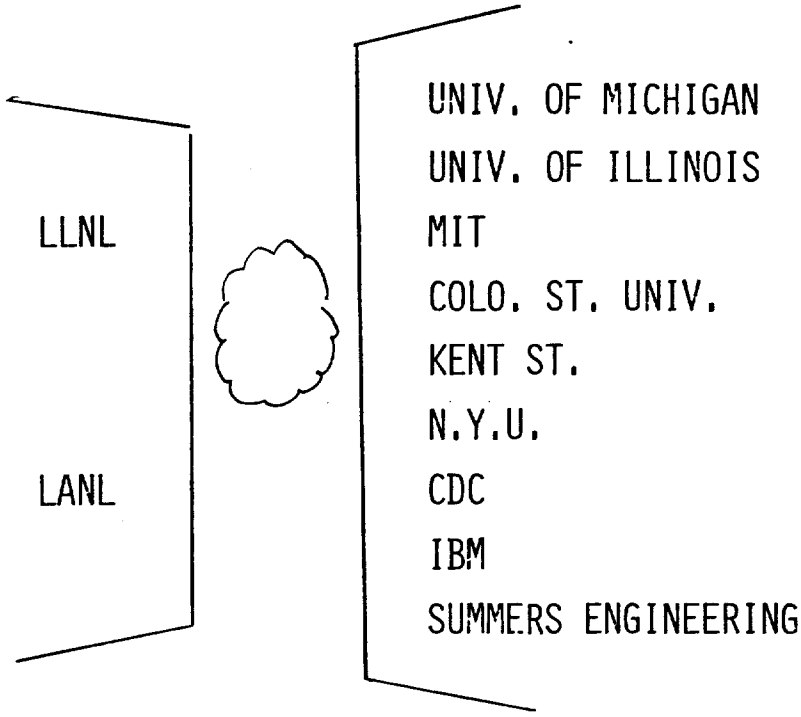
WE THINK THE 1985 GOAL IS ACHIEVABLE.
THE 1990 GOAL IS NOT NOW CERTAIN

THE KEY ISSUE(S):

- LANGUAGES
- IMPROVING THE USER INTERFACE
  - EASE OF USE
  - MULTI PROCESSING USER'S OFFICE
    (REMOVAL OF DISTRACTIONS AND FRUSTRATIONS)
  - RESPONSIVENESS

CURRENT

COLLABORATIONS



A RANDOM MENU OF TASKS YET TO BE STARTED

THE INTELLIGENT DESK

VOICE IN/OUTPUT

STORAGE ($> 10^{16}$ BITS)

DATA BASE MANAGEMENT

SECURITY

VERY LARGE MEMORY STRUCTURES

NETWORKS (LOCAL AND REMOTE)

GRAPHICS

A SPECIAL INTEREST GROUP?

ESTABLISHMENT OF AN UNCLASSIFIED
CENTER FOR LARGE CODE DEVELOPMENT

- NATIONAL NEEDS
- CHEMISTRY,
  GEOPHYSICS,
  ASTROPHYSICS

LANL LLNL

COLLABORATIONS

ALGORITHMIC RESEARCH

MODELING OF LARGE SCALE CALCULATIONS

COMPUTATIONAL EXPERIMENTS

LANGUAGE RESEARCH

COMMON OPERATING SYSTEM

SHARED DATA BASES

STAFF INTERCHANGE

THE NEXT MEETING(S)

COLLABORATIONS

PROVISION FOR RESPONSES BY MANUFACTURERS

DISTRIBUTION OF TEST PROBLEMS

MECHANISMS FOR MAINTAINING GROUP COMMUNICATIONS

THERE IS NO LIMIT TO WHAT

WE CAN ACCOMPLISH

PROVIDED

YOU DON'T CARE WHO GETS THE CREDIT